WESTERN MINERAL PRODUCTS RESIDENTIAL CLEANUP

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Asbestos Site Evaluation, Communicaiton and Cleanup

Keystone, Colorado
September 22—26, 2003



SITE BACKGROUND
Overview

- The industrial site was used as an exfoliating plant for vermiculite ore originating from the Libby, Montana mine from mid 1960's until 1989
- PRP placed piles of waste ore containing tremolite asbestos outside of the facility for residents to take and use
- U.S. EPA conducted site assessment activities in 2000 and identified contaminated residences within a 0.5-mile radius of the site
- During the summer/fall of 2000 through 2003, assessment and removal activities were completed by the U.S. EPA



SITE BACKGROUND
Overview

Processing plant:

location and waste pile

SATURDAY, JUNE 17 • 2000

A 1978 family photo, published in the Star Tribune in March, shows two sons of the late Harris Jorgenson playing in a vermiculite scrap heap. Survivors of Jorgenson, who also played on the heap as a child, blame his death from lung cancer on asbestos dust from the pile.

SITE BACKGROUND
Geography/Affected Area

- Cleanup area was primarily contained within a 0.5-mile radius of the Industrial Site located in Minneapolis, Hennepin County, Minnesota
- Public outreach efforts identified a moderate number of residential properties outside of the 0.5-mile radius
- Approximately 1,648 residential properties were assessed, and 251 residential properties have undergone removal activities



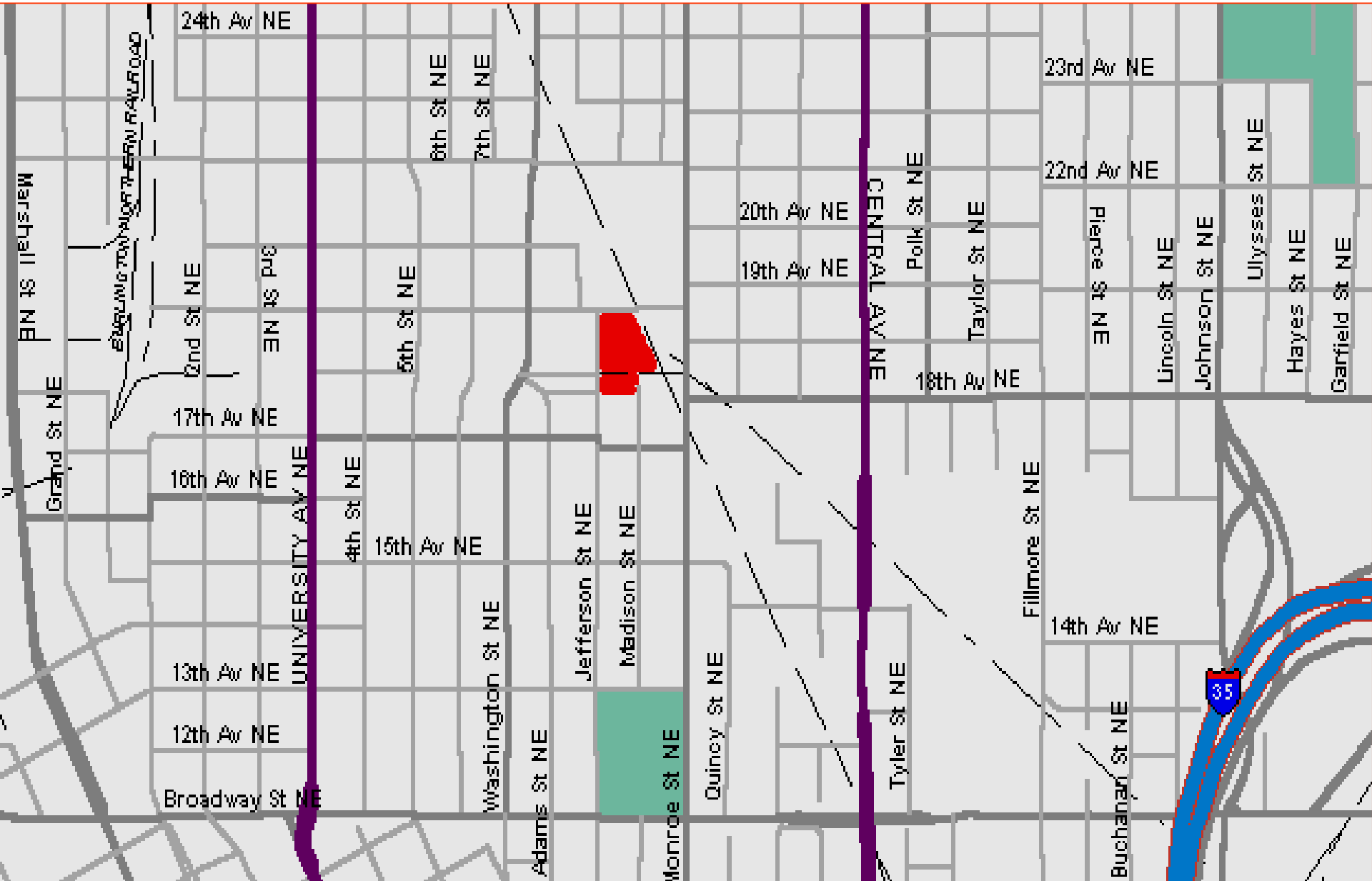
SITE BACKGROUND
Geography/Affected Area

- Examples of contamination in neighborhood

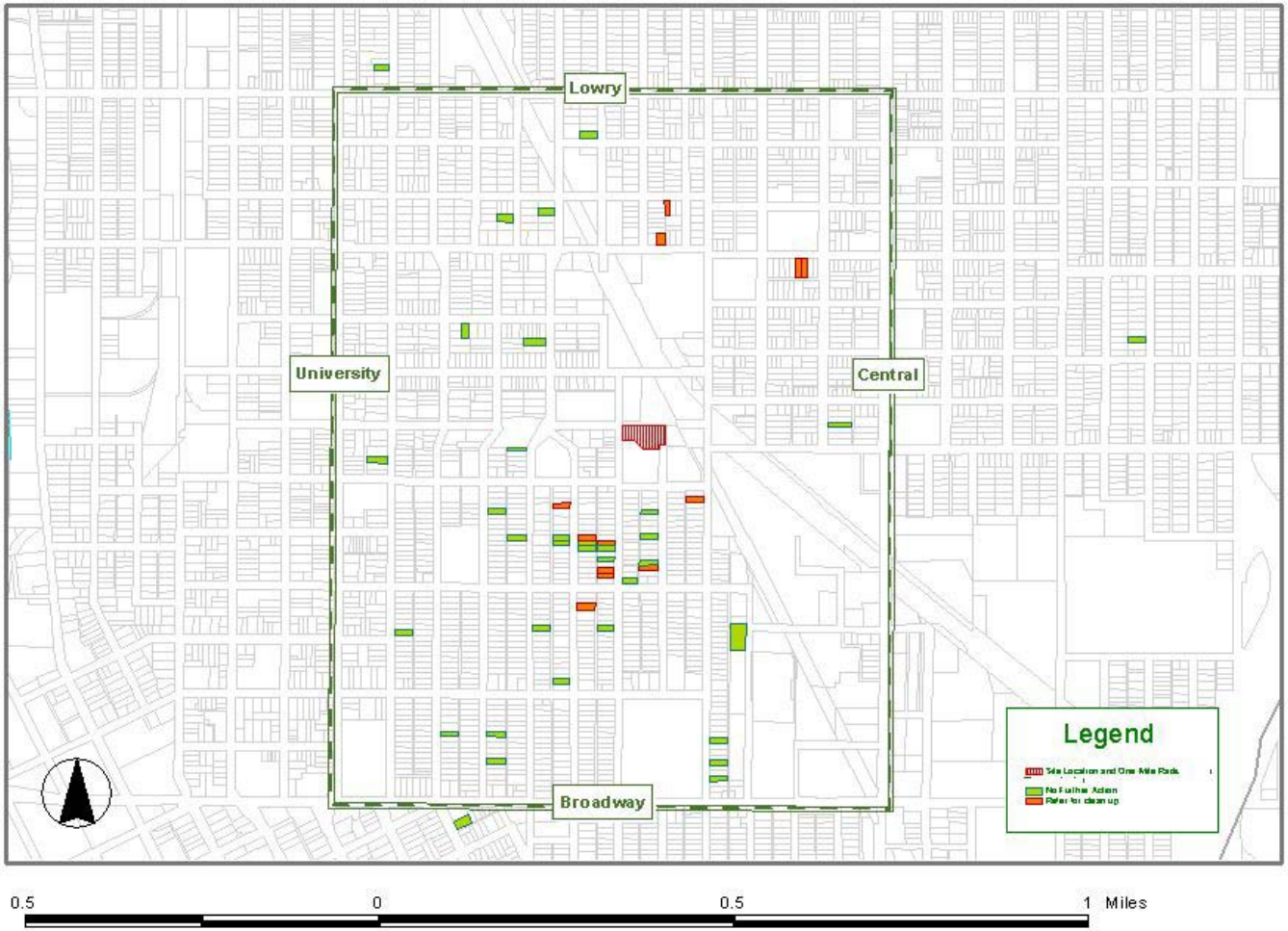
Tremolite in garden

Tremolite in driveway

INDUSTRIAL SITE LOCATION



RESIDENTIAL CLEANUP LOCATION



SITE BACKGROUND
Population Affected

- Census tract data indicated that the Industrial Site was located in a block group with a population of 376
- Population met U.S. EPA demographic criteria for an Environmental Justice (EJ) Case



SITE BACKGROUND

Mineral Forms of Asbestos

- Predominant fibers are of the tremolite-actinolite solid solution series (amphibole asbestos) originally mined from the Libby ore deposit
- Fibers identified within air and soil samples were tremolite, chrysotile, and actinolite



SITE BACKGROUND
Asbestos-Related Health Effects

- Occupational Exposure: Studies of mine workers in Libby workers demonstrated exposure to the amphibole asbestos series is associated with a asbestos-related disease (asbestosis, mesothelioma, and lung cancer) and death
  - Investigations of former Western Minerals employees indicated a significant number of cases of asbestos-related disease (25-30 cases of asbestos-related disease)
- Environmental Exposure: Several cases of asbestos disease have been reported in individuals with no known asbestos exposure, but who played in the waste ore pile as children



ACTIVITIES BY EXPOSURE PATHWAY – Soil - Sampling

- Polarized Light Microscopy (NIOSH Method 9002) used for both site characterization (SC) and extent of contamination (EOC) soil samples
- Transmission Electron Microscopy and PLM Methods used for Post Excavation (PE) soil samples. At least one TEM PE soil sample was collected from each residence after excavation
- Location and quantity of samples dependent on site characteristics. EOC samples were collected to include or exclude discrete portions of properties



ACTIVITIES BY EXPOSURE PATHWAY – Soil - Sampling (cont.)

- PE samples were collected from discrete portions of the excavated areas (based upon size of area and depth of excavation)
- Number of Samples: 2,771 soil samples



ACTIVITIES BY EXPOSURE PATHWAY – Soil - Sampling (conclusion)

- Problems: None



ACTIVITIES BY EXPOSURE PATHWAY – Soil - Analysis

- Mineralogic Asbestos Evaluation: PLM analysis was useful in determining asbestos content, TEM analysis was useful in identifying the type of asbestos fibers present (actinolite, amosite, anthophyllite, chrysotile, and tremolite)
- Specific Counting Procedures or Rules: PLM analysis followed EPA Method 600R-93/116, and TEM analysis followed NYS Method ELAP 198.4



ACTIVITIES BY EXPOSURE PATHWAY – Soil - Analysis (cont)

Estimated Sensitivity to Methods:

- PLM – 1% asbestos;
- TEM - ~1% asbestos

Deviations from Standard Protocols:

- To simplify the reporting process, reports had tremolite listed in results instead of actinolite complex



ACTIVITIES BY EXPOSURE PATHWAY – Soil - Analysis (conclusion)

Issues:

- Reporting regulated vs. Non-regulated asbestos fibers



ACTIVITIES BY EXPOSURE PATHWAY – SOIL - Results

- Concentrations ranged from non-detect to 75% tremolite



ACTIVITIES BY EXPOSURE PATHWAY – SOIL - Estimated Risks

- Risks: U.S. EPA has not established an asbestos level in soil below which exposure does not pose a risk. Superfund sites in Region IX found that concentrations of <1% posed inhalation risks when disturbed by traffic. Residential setting of sites would allow asbestos to be tracked into buildings or off-site, and dry soil conditions might allow the migration of fibers
- U.S. EPA Regional Toxicologist was consulted and reviewed available site data as well as available epidemiological data from Libby and current literature



ACTIVITIES BY EXPOSURE PATHWAY – SOIL - Remediation Strategy

- Inspect residential properties to determine if cleanup is required (public outreach)
- Define EOC within affected residential properties
- Excavated contaminated soil to a minimum depth of 6-inches and a maximum depth of 18-inches
- Install a geosynthetic liner at the terminal depth of the excavation and backfill with clean soil or gravel
- Vacuum alleys and driveways to remove asbestos on the surface



ACTIVITIES BY EXPOSURE PATHWAY – DUST - Sampling

- Dust sampling was not conducted, because it was outside the scope of this cleanup



ACTIVITIES BY EXPOSURE PATHWAY – AIR - Sampling

- Methods Used: TEM method using the Asbestos Hazard Emergency Response Act (AHERA) protocol
- Location of Samples: Sample location was determined by the size of an excavation area. Air sampling locations were established around the perimeter of the work zone on both the up- and downwind sides
- Number of Samples: 2,128 air samples



ACTIVITIES BY EXPOSURE PATHWAY – AIR - Sampling (conclusion)

- Problems: Air sampling cassettes were subjected to overloading due to exhaust from excavation equipment, high concentrations of pollen within the air, and general nuisance dust. However, less than 5% of samples were not able to be analyzed due to these interferences
- Solutions: Dust suppression techniques were utilized throughout excavation activities (watering of excavation, covering excavation and stockpiles with polyethylene sheeting, and site control measures) to minimize airborne exposure



ACTIVITIES BY EXPOSURE PATHWAY – AIR - Analysis

Mineralogic Asbestos Evaluation:

- TEM air analysis identifies the specific type of asbestos structures present

Specific Counting Procedures or Rules:

- TEM followed EPA Method 40 CFR Part 763 Final Rule (AHERA)



ACTIVITIES BY EXPOSURE PATHWAY – AIR - Analysis (cont)

Estimated Sensitivity to Methods:

- Sensitivity ranged from 0.0008 structures per cubic centimeter (S/cc) to 0.001 S/cc

Deviations from Standard Protocols:

- Standard sensitivity is 0.005 S/cc, but toxicologist recommended that a lower detection limit be used to protect the public



ACTIVITIES BY EXPOSURE PATHWAY – AIR - Analysis (conclusion)

- Issues: None



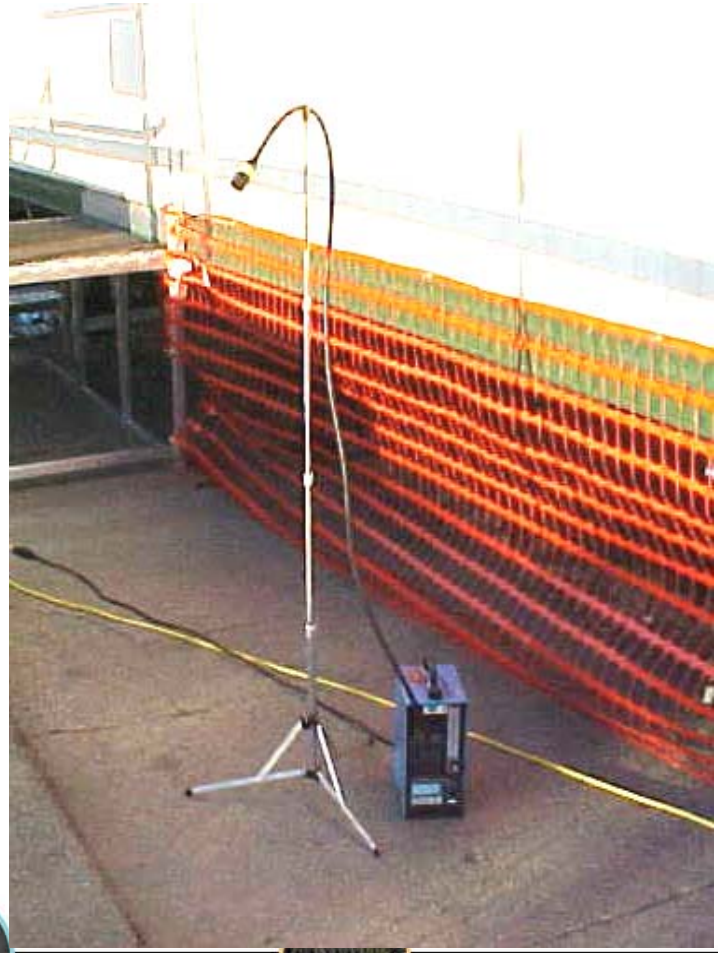
ACTIVITIES BY EXPOSURE PATHWAY – AIR - Results

- Personal Monitors: Excavation personal monitored during entire workday. PCM analysis performed on cassettes. Results ranged from below detection limit to 0.1 fibers per cubic centimeter (f/cc).
- Area Sampling: less than 0.0008 S/cc to 0.0531 S/cc



ACTIVITIES BY EXPOSURE PATHWAY – AIR - Sampling Equipment

Area sampling



ACTIVITIES BY EXPOSURE PATHWAY – AIR - Estimated Risks

- Risks: U.S. EPA has not established an asbestos level in outdoor air above which exposure poses a risk. A U.S. EPA Regional Toxicologist was consulted and reviewed available site data as well as available epidemiological data from Libby and current literature to establish a target level of less than 0.001 S/cc.



Site Remedial Actions – Actions Completed

- Total number of properties: 1,648
- Total Number of cleanup targets identified: 269
- Total Number of cleanup properties addressed: 251
  - Cleanup Properties with access denied: 8
  - Cleanup Properties that have not responded to request for access/request for removal: 9
  - Cleanup Properties pending negotiations with owner: 1



Site Remedial Actions – Ongoing Site Plans

- Finish remaining properties
- No other ongoing remediation



QUESTIONS?

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